10030465

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
1406-DARPA		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US 01/ 16829	23/05/2001	30/05/2000
Applicant		
THE JOHNS HOPKINS UNIVERSITY		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 8

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/16829

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01J49/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	RAGUNATHAN N ET AL: "Gas chromatography with spectroscopic detectors" JOURNAL OF CHROMATOGRAPHY A, ELSEVIER SCIENCE, NL, vol. 856, no. 1-2, 24 September 1999 (1999-09-24), pages 349-397, XP004180087 ISSN: 0021-9673 page 386 --- -/--	1

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 May 2002	24/05/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hulne, S

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/16829

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	ZIMMERMAN G A ET AL: "Analysis of I/O efficient order-statistic-based noise power estimators" DIGITAL SIGNAL PROCESSING 2, ESTIMATION, VLSI. SAN FRANCISCO, MAR. 23 - 26, 1992, PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING (ICASSP), NEW YORK, IEEE, US, vol. 5 CONF. 17, 23 March 1992 (1992-03-23), pages 437-440, XP010059317 ISBN: 0-7803-0532-9 page V-437 ---	1
A	US 6 008 490 A (KATO YOSHIAKI) 28 December 1999 (1999-12-28) abstract ---	1
A	US 5 352 891 A (MONNIG CURTIS A ET AL) 4 October 1994 (1994-10-04) abstract -----	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 01/16829

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6008490 A	28-12-1999	JP 10274640 A	13-10-1998
US 5352891 A	04-10-1994	NONE	

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 09 January 2002 (09.01.02)	
International application No. PCT/US01/16829	**Applicant's or agent's file reference** 1406-DARPA
International filing date (day/month/year) 23 May 2001 (23.05.01)	**Priority date** (day/month/year) 30 May 2000 (30.05.00)
Applicant HAYEK, Carleton, S. et al	

1. The designated Office is hereby notified of its election made:

   [X] in the demand filed with the International Preliminary Examining Authority on:

   13 December 2001 (13.12.01)

   [ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

   [ ] was not

   made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

ENGER Charlotte

Telephone No.: (41-22) 338.83.38

10/080465

8

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
1406-DARPA		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US01/16829	23/05/2001	30/05/2000
International Patent Classification (IPC) or national classification and IPC H01J49/00		
Applicant THE JOHNS HOPKINS UNIVERSITY ET AL.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
13/12/2001	14.08.2002
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer van Toledo, W Telephone No. +49 89 2399 2481

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US01/16829

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-40 as originally filed

Claims, No.:

1-11 as originally filed

Drawings, sheets:

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-11
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-11
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations
see separate sheet

The CFAR model is presented in the present description (paragraphs 0077 - 0101) and in document D2. It consists of determining the threshold for signal or noise,T, from a user selected probability of false alarm, P_{FA}, and a suitable noise model. Document D1 discusses various methods to improve the S/N gain, by averaging spectra (p.363, r.column), by Principal Component Analysis (p.386, l.column) or by a least square fit of the spectra (p.391, r.column). However, it does not refer to determining the noise threshold in a way which points towards a CFAR algorithm. Document D2 is concerned with the processing of data collected from sky surveys (the SETI project) and lacks any reference to the processing of mass spectra from a mass spectrometer. D3 and D4 do relate to mass spectra analysis but do not treat the noise and threshold problem in a way which approaches the CFAR model.

Consequently, the subject-matter of claim 1, and therefore of the respective dependent claims, is new (Article 33.2 PCT).

2. Inventive step

With regard to the closest prior art, D1, the technical problem may be defined as how to provide a controller for processing mass spectra such that the mass peaks are extracted from the noisy background in an alternative way. This technical problem has been solved according to present claim 1, by using a controller which provides a constant false alarm rate (CFAR).

Since D2 is the only document in which CFAR is mentioned, this document however lacking any reference to the processing of mass spectra, any combination of the available prior art items would fail to lead to the present subject-matter.

Therefore, claim 1, as well as the claims dependent thereon, involve an inventive step (Article 33.3 PCT).

3. Industrial applicability

of the claimed subject-matter is obvious (Article 33.4 PCT).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
6 December 2001 (06.12.2001)

PCT

(10) International Publication Number
WO 01/093308 A3

(51) International Patent Classification[7]: H01J 49/04

(21) International Application Number: PCT/US01/16829

(22) International Filing Date: 23 May 2001 (23.05.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/207,907	30 May 2000 (30.05.2000)	US
60/208,089	31 May 2000 (31.05.2000)	US
60/208,877	1 June 2000 (01.06.2000)	US

(71) Applicant *(for all designated States except US)*: **THE JOHNS HOPKINS UNIVERSITY** [US/US]; Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **HAYEK, Carleton, S.** [US/US]; 3121 Evergreen Way, Ellicott City, MD 21043 (US). **DOSS, O., William, III** [US/US]; 4304 Skymist Terrace, Olney, MD 20832 (US).

(74) Agents: **COOCH, Francis, A.** et al.; The Johns Hopkins University, Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

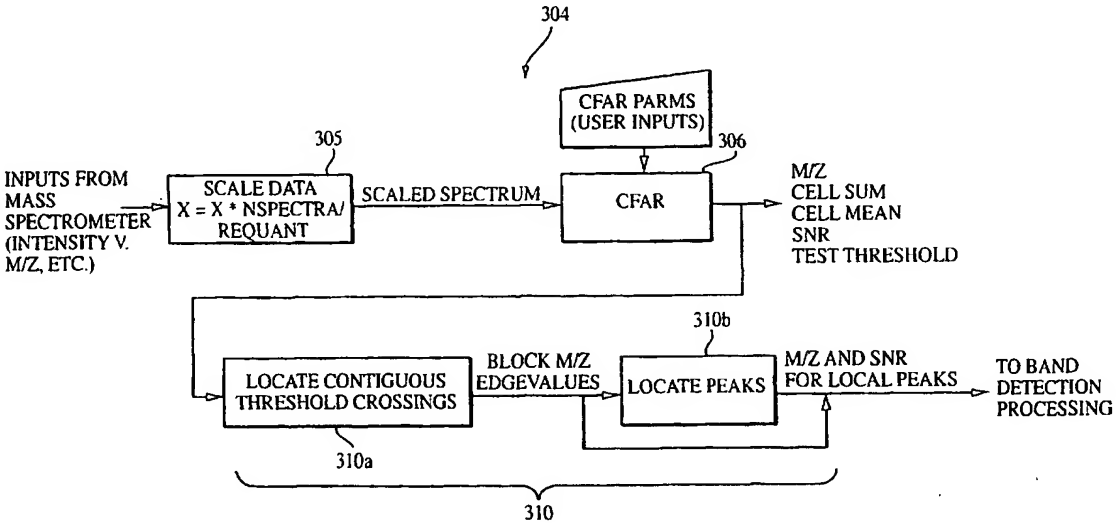
Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

[Continued on next page]

(54) Title: THREAT IDENTIFICATION FOR MASS SPECTROMETER SYSTEM



(57) Abstract: A controller that processes the mass spectrum of a sample provided by a detector of a mass spectrometer, for example, by a field portable mass spectrometer system. The controller provides a constant false alarm rate (CFAR) processing of the mass spectral data received. The CFAR processes the mass spectral data to determine noise included in the mass spectral data and outputs spectral peaks when the mass spectral data exceeds a threshold that reflects the noise included in the spectral data. The output peaks are compared with spectral peaks for known threats stored in a database and a notification that a known threat is present in the sample is provided if there is a correspondence between one or more output spectral peaks and one or more spectral peaks of a known threat as stored in the database.

WO 01/093308 A3

(88) Date of publication of the international search report:
11 July 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

IN RNATIONAL SEARCH REPORT

Inter nal Application No
PCT/US 01/16829

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01J49/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	RAGUNATHAN N ET AL: "Gas chromatography with spectroscopic detectors" JOURNAL OF CHROMATOGRAPHY A, ELSEVIER SCIENCE, NL, vol. 856, no. 1-2, 24 September 1999 (1999-09-24), pages 349-397, XP004180087 ISSN: 0021-9673 page 386 --- -/--	1

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 May 2002	24/05/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hulne, S

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	ZIMMERMAN G A ET AL: "Analysis of I/O efficient order-statistic-based noise power estimators" DIGITAL SIGNAL PROCESSING 2, ESTIMATION, VLSI. SAN FRANCISCO, MAR. 23 - 26, 1992, PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING (ICASSP), NEW YORK, IEEE, US, vol. 5 CONF. 17, 23 March 1992 (1992-03-23), pages 437-440, XP010059317 ISBN: 0-7803-0532-9 page V-437	1
A	US 6 008 490 A (KATO YOSHIAKI) 28 December 1999 (1999-12-28) abstract	1
A	US 5 352 891 A (MONNIG CURTIS A ET AL) 4 October 1994 (1994-10-04) abstract	1

IN RNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/US 01/16829

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6008490 A	28-12-1999	JP 10274640 A	13-10-1998
US 5352891 A	04-10-1994	NONE	

US 1003046503P1

Creation date: 11-21-2003
Indexing Officer: TBUI1 - THU-TRANG BUI
Team: OIPEBackFileIndexing
Dossier: 10030465

Legal Date: 03-20-2002

No.	Doccode	Number of pages
1	M903	2

Total number of pages: 2

Remarks:

Order of re-scan issued on .....